A Marshall Cavendish Collection

EVERY FORTNIGHT

QUEST

ADVENTURES IN THE WORLD OF SCIENCE

INTO THE UNKNOWN

35

THREE PROJECTS

FACT FILES ON:

- Searching the stars for life
- Advances in medicine
- Ghostbusting
- Strange worlds
- UFOs
- Earthly monsters

MODEL: VOYAGER 2

GIANT POSTER

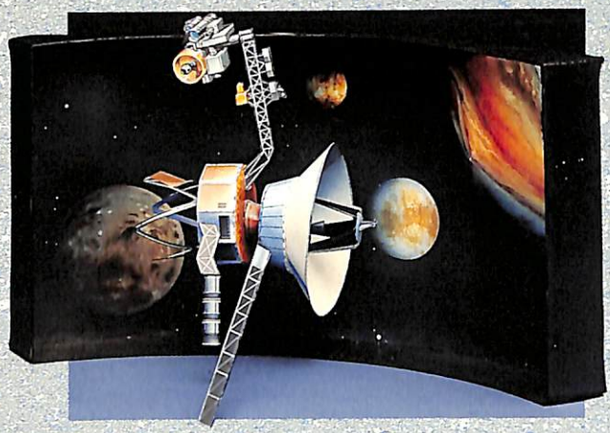
UK £1.99 IR£2.25 Aust $4.95 NZ $5.95 (inc. GST) Malaysia RM5.90 Sing $5.95 Malta Lm1.75 S. Africa R8.95

FULLY SOR

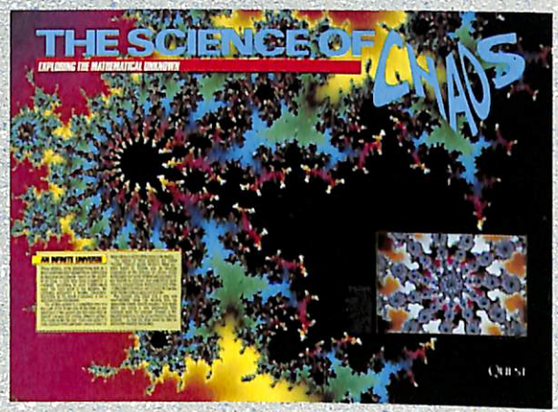
INSIDE THIS PACK

FACT FILES

▶ Mapping Venus ▶ The latest medical machines ▶ Monstrous sea creatures ▶ Kingdoms of ice ▶ Conquering mountains ▶ Cosmic clouds ▶ Ghosts and poltergeists



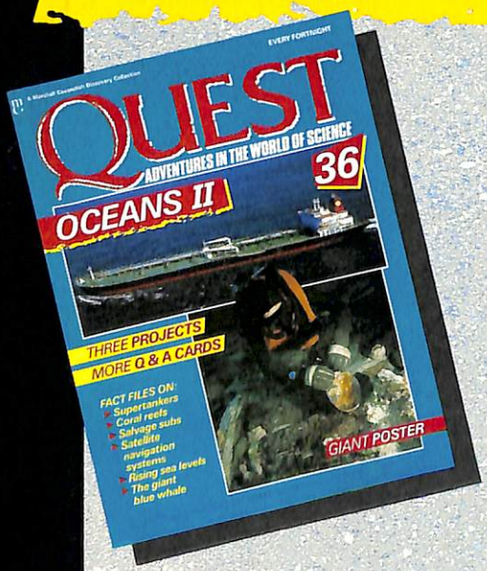
MODEL Space Voyage



POSTER
The Science of Chaos

THREE SCIENTIFIC PROJECTS

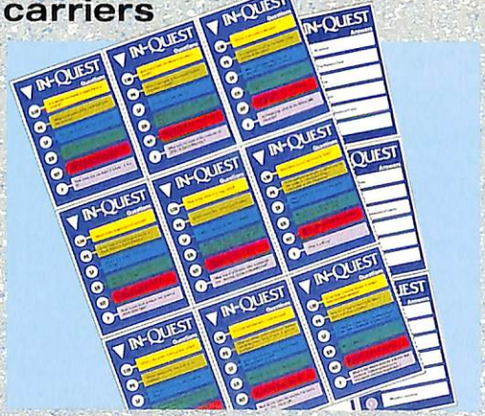
COMING IN QUEST 36 OCEANS II



FACT FILES INCLUDE:

▶ Navigation ▶ Treasure hunting ▶ Supertankers ▶ The Great Barrier Reef ▶ Salvage ▶ Survival of the whale ▶ Cargo carriers

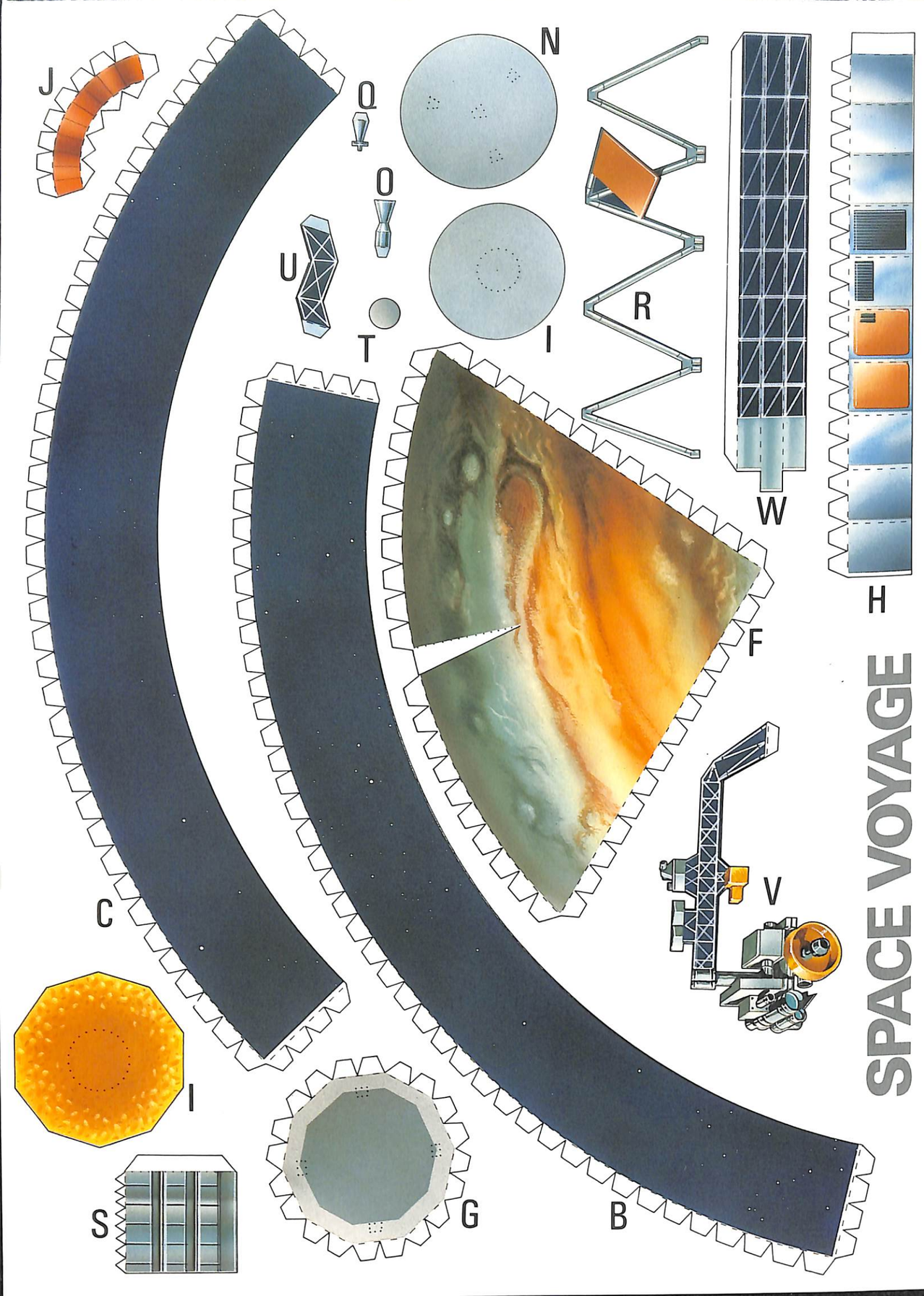
POSTER
Cruising the seas

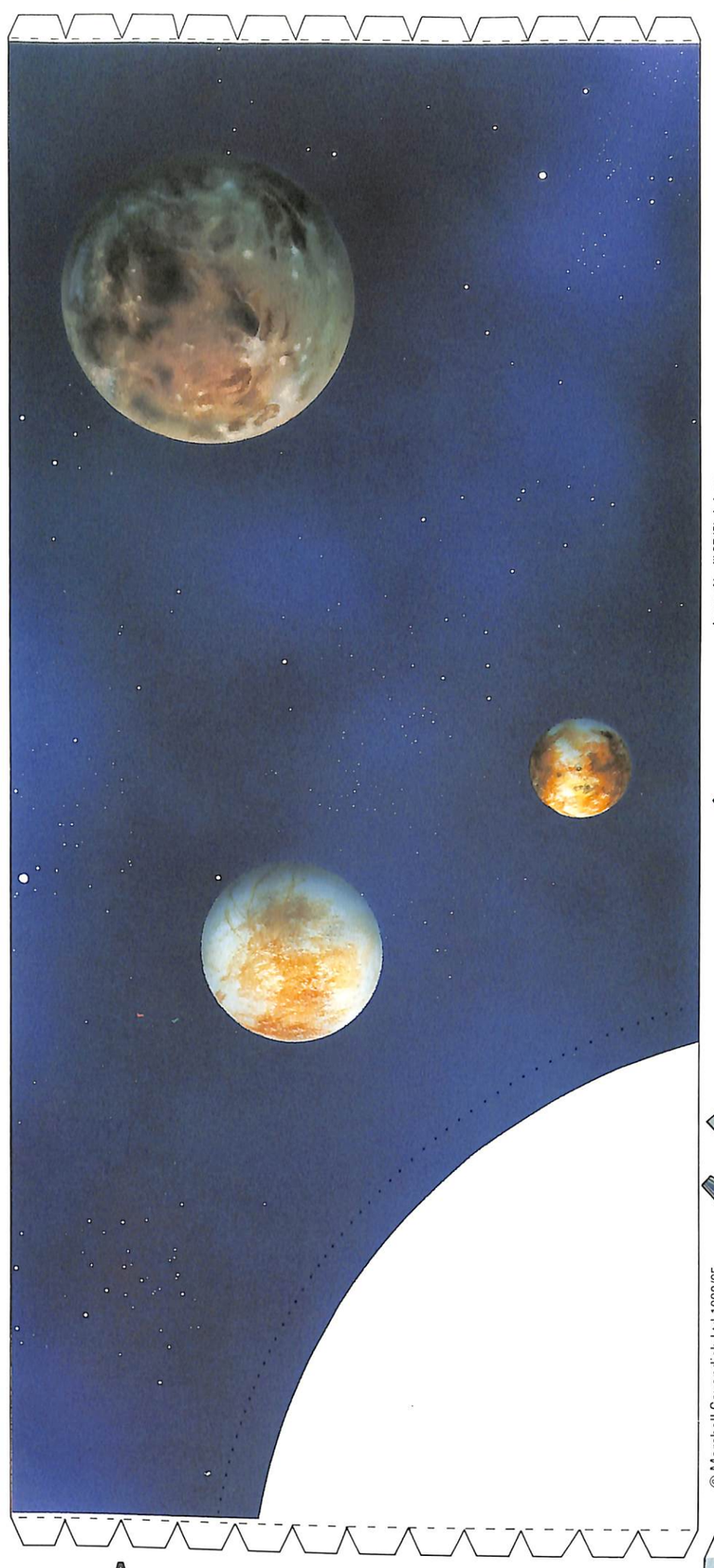


More *In-Quest* Q & A cards

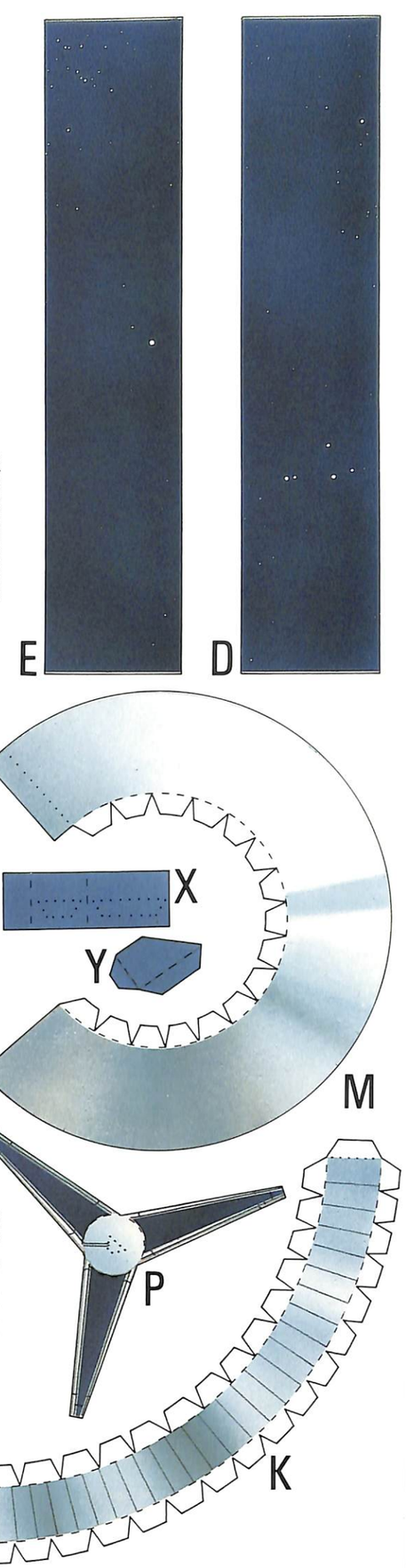
ISSN 1350-3766

SPACE VOYAGE

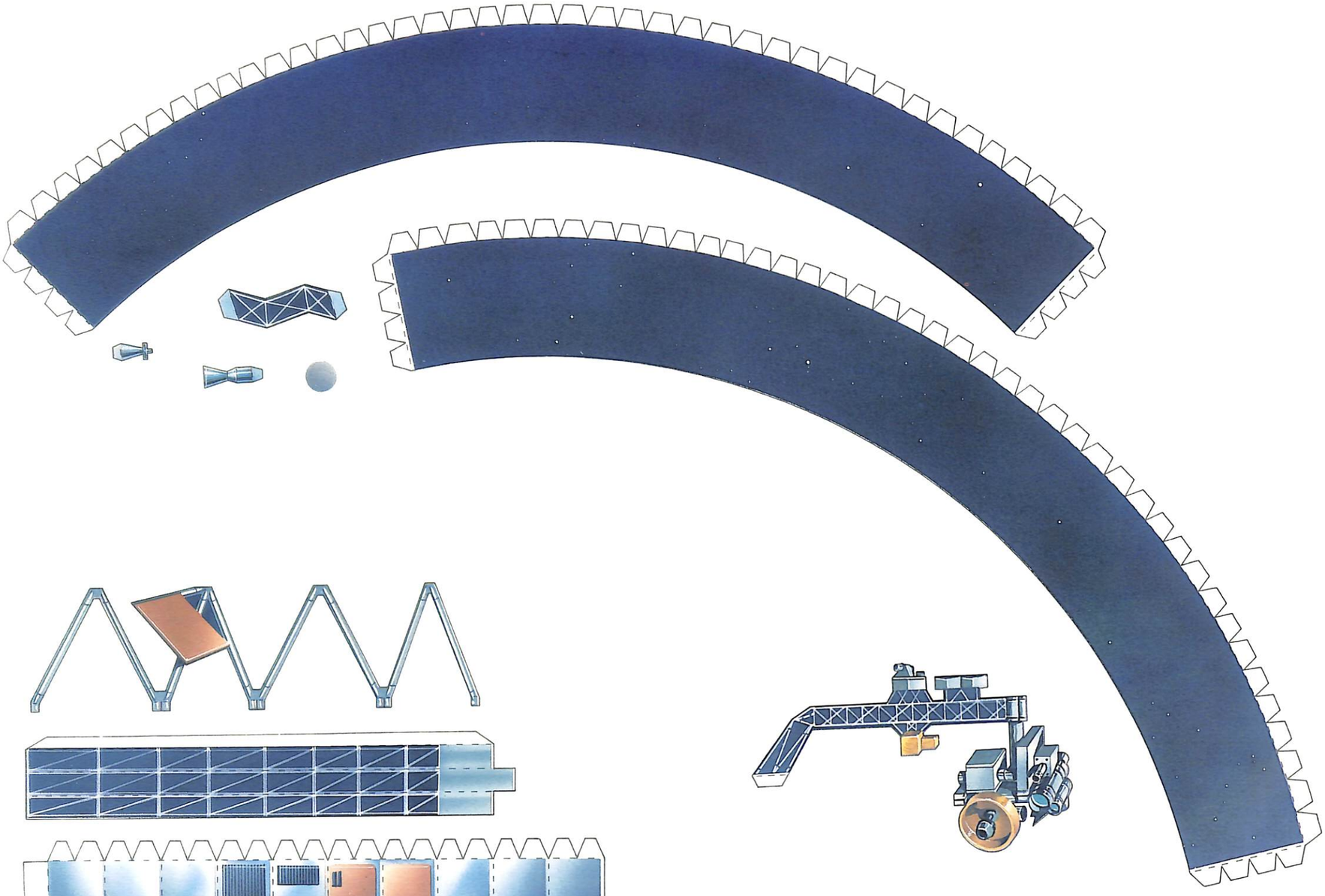


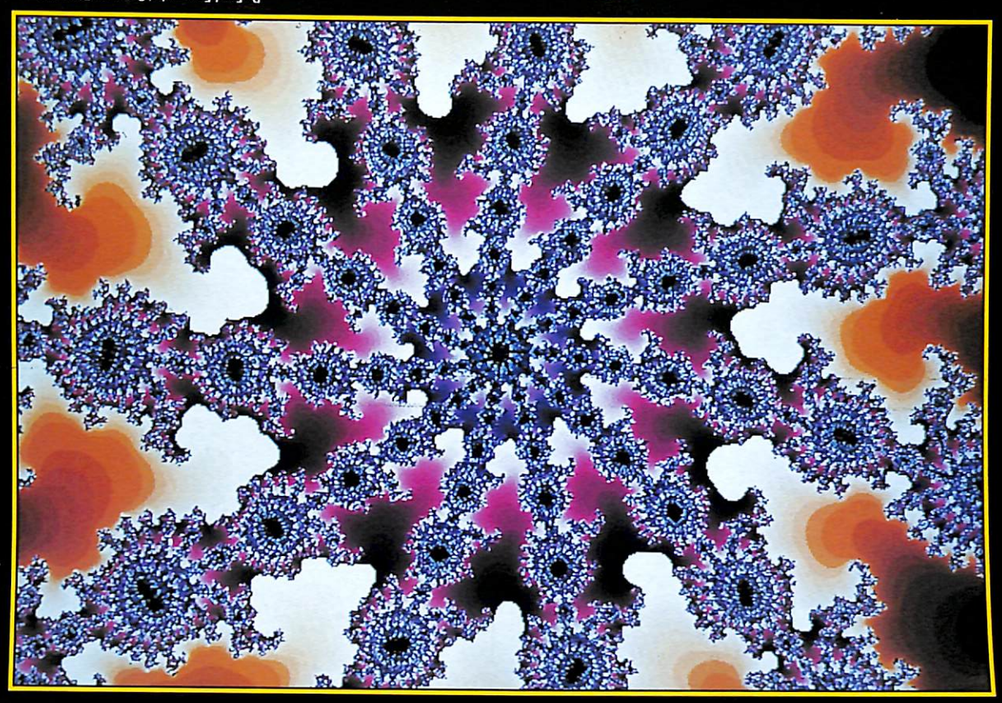


James Nevill 3D/Chris Lyon



A





Dr Fred Espenak / Science Photo Library

This fractal pattern *was first studied by the American mathematician Benoit Mandelbrot. Zooming in on any part of the large picture will reveal another intricate pattern, such as this one (inset). This process can be repeated an infinite number of times.*

QUEST

EDGE OF CHAOS

THE SCIENC

EXPLORING THE MATHEMATICAL UNKNOWN

AN INFINITE UNIVERSE

These swirling, richly detailed forms look as if they could have been painted by an artist trying to represent intergalactic Space or the depths of an atom. In fact, they were created by a computer according to strict mathematical rules. For each point in the pictures, the computer performed a lengthy calculation. According to the result it obtained, it put a different colour at that point.

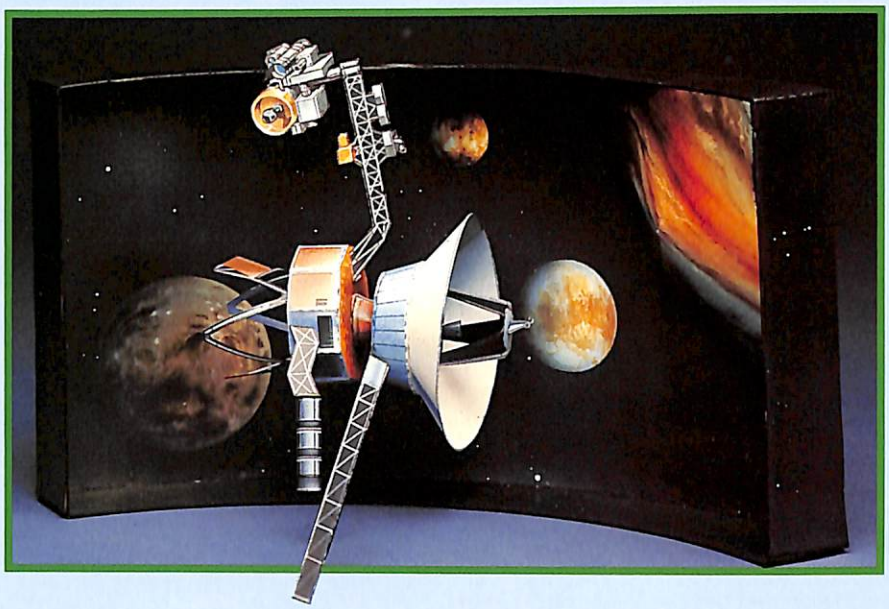
The smaller picture is a magnified view of a tiny part of the larger one. If you blow up any small part of this picture you will again find an equally complex but entirely different picture. You could do this for ever. Each new pattern is truly a picture of the unknown, since no one can tell in advance what will be found in its depths.

The curves in these patterns are called 'fractals' ('fractal' means 'broken'). Other pictures based on fractals give an amazing impression of the textures of clouds, rocky landscapes and so on. Mathematicians hope to use fractals to describe and understand such chaotic, irregular forms. Fractals are part of the 'mathematics of chaos', which seeks to find the order hidden behind apparent disorder.

But fractals also show that a wild and unpredictable result can develop from an apparently simple, orderly equation. This might mean our world is less predictable than scientists hope. For example, changes in the weather may turn out to be as chaotic as these pictures – so that we shall never be able to predict the weather accurately.

MODEL ASSEMBLY INSTRUCTIONS

SPACE VOYAGE



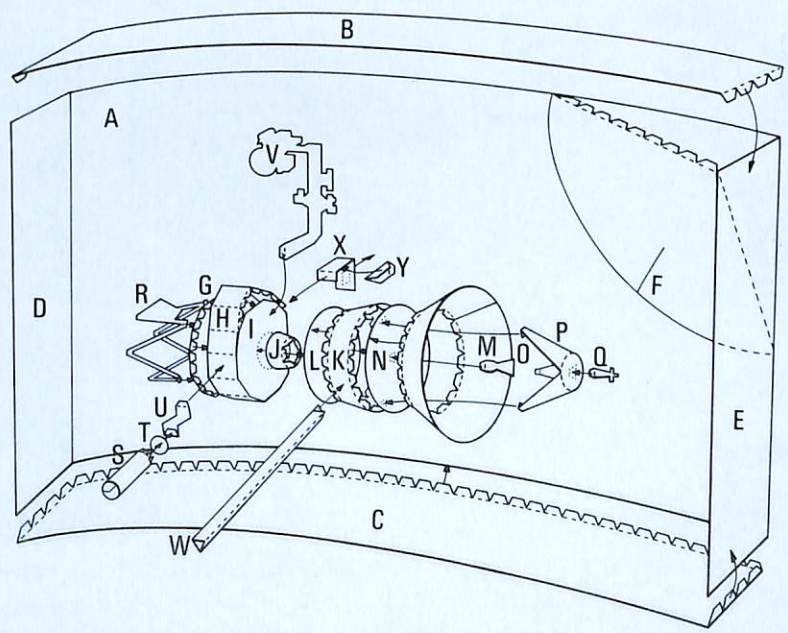
You will need
Scissors • Ruler • Craft knife • Glue

Before cutting out the pieces, score along all broken lines with a blunt edge and ruler to make folding and gluing easier. Study the ASSEMBLY DIAGRAM to see how the pieces fit together, and use dotted lines as a guide for positioning.
NB Younger children will need supervision when using a craft knife.

To make up
Diorama
1 Cut out background **A** (showing moons of Jupiter) and part **B**. Fold down tabs on curved edge of part **B** and glue to top edge of **A**, ensuring coloured side matches Space background on part **A**. Cut out part **C**, fold tabs on curved side upwards and glue to back of bottom edge of **A**, again making sure that coloured side faces inwards.
2 Cut out **D** and glue to tabs of **B**, **A** and **C** along one side of diorama. Repeat with part **E** along other side of diorama.
3 Cut out planet Jupiter **F**. Cut and glue slit to make slight curve. Fold down all **F**'s tabs, and glue **F** into top right corner of diorama (see ASSEMBLY DIAGRAM).

Space probe Voyager 2
1 Cut out frame parts **G**, **H** and **I**. Fold tabs on **G** and then glue tabs to edge of **H** without tabs, so that **H** wraps around **G**. Glue **I** to tabs on **H**.
2 Cut out propulsion fuel tank **J** and glue into cone shape. Glue tabs on wider end of **J** to dotted circle on **I**. Cut out part **K** and glue into cone shape. Cut out part **L** and glue to narrower end of **K**.
3 Cut out radio dish **M** and glue into cone shape. Cut out **N** and glue to folded tabs on **M**, so that coloured side is visible on inside of dish.
4 Fold tabs on **K** inwards and glue to white side of **N**. Glue tabs on **J** to dotted circle on **L**.
5 Cut out part **O** and glue to centre of **N**, inside radio dish. Cut out antenna base **P**, score along broken lines at centre and fold legs down. Glue legs to dotted positioning marks on **N**. Then cut out antenna **Q** and glue to platform on **P**.
6 Cut out frame section **R**, fold down tabs and glue tabs to dotted position indicators on **G** (see ASSEMBLY DIAGRAM).
7 Cut out power generator **S**, glue into tube shape and fold tabs inwards. Cut out arm **T** and glue on to tabs on **S**. Cut out **U** and glue underside of tab to **T**.
8 Cut out arm **V**, which carries cameras and other instruments. Cut out arm **W** holding magnetic field detectors, fold and glue to shape (see ASSEMBLY DIAGRAM).

To finish
1 Glue underside of tab on arm **W** to **K**. In the same manner glue arm **U** to **H** and arm **V** to **I** (see ASSEMBLY DIAGRAM).
2 Cut out **X** and **Y**. Glue tabs on **Y** to dotted markers on **X**, so that only dark blue will be visible when attachment is mounted on diorama.
3 To attach Voyager 2 to background, fold down tab on **S**, glue back of tab to **H** and then glue side of **S** without tab to background.



Q PROJECTS

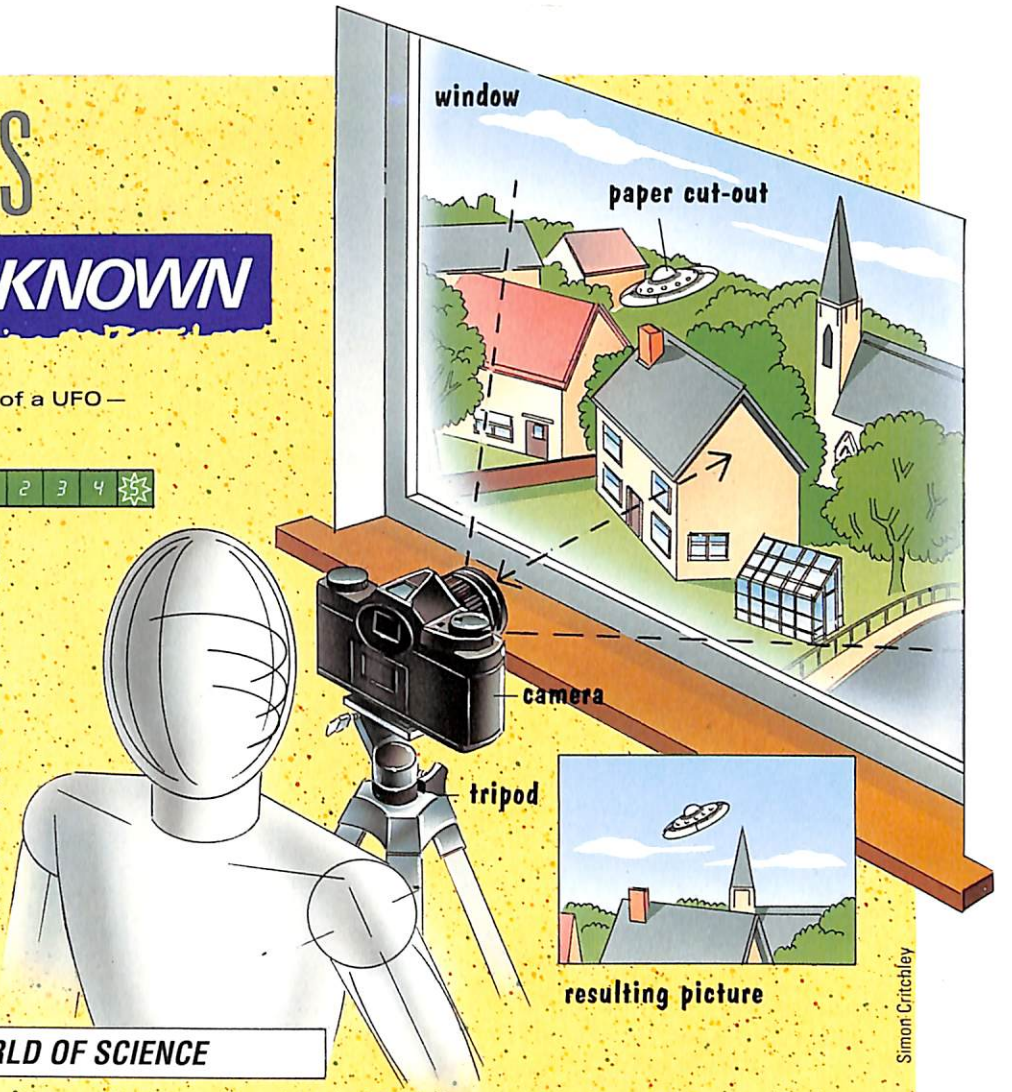
INTO THE UNKNOWN

• How can you take a photograph of a UFO — an unidentified flying object?

FAKE A UFO PHOTO

1 2 3 4 5

With a little ingenuity, it is not too difficult to produce a fake UFO photograph.
You will need a camera and film, a sheet of paper, a pair of scissors and some paper glue. First find a window that overlooks a good expanse of sky and clean it thoroughly, both inside and out. Next cut a thin oval shape from the paper and stick it high on the window, so that it appears to be in the sky. Now focus your camera on the sky and, standing about 40 cm from the window, take your photograph. Move around and try different compositions. When the film has been developed you should have some credible pictures of UFOs.



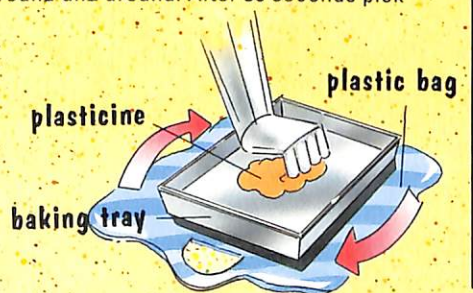
Simon Critchley

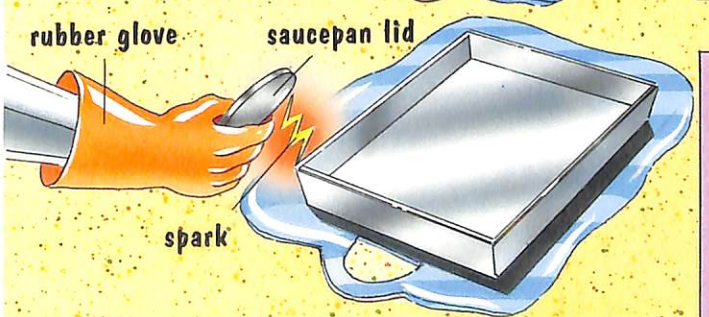
ADVENTURES IN THE WORLD OF SCIENCE

CREATING A SPARK

1 2 3 4 5

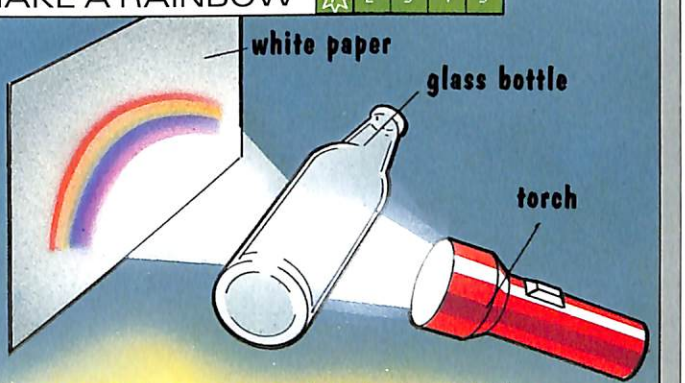
You need a large metal tray or a baking tray, a large polythene bag such as a plastic rubbish bag, a large lump of plasticine and a metal tin lid. First press the plasticine firmly on to the metal tray. Spread the polythene bag out on a table and place the tray on it. Now, holding the bag still, grasp the plasticine and move the tray around and around. After 30 seconds pick up the tray by the plasticine, then hold the tin lid close to one corner. You will see a spark jump from the tray to the lid. The effect, which mimics lightning, is better in the dark.





MAKE A RAINBOW

1 2 3 4 5



You need a glass bottle, a torch and a sheet of white paper. If you shine the torch on to the piece of paper through the glass, the colours in the light will be separated to give the colour spectrum from red to violet – as with a rainbow.

PROJECT INFORMATION

1 2 3 4 5

Each **QUEST** project and model has its own difficulty rating:
1 very simple , 2 simple ,
3 intermediate, 4 advanced,
5 complicated

Every care has been taken to ensure projects are as safe as possible. However, parents should supervise all projects. The publisher can accept no liability for injury.

WARNING!